10,002,282.

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 6,746,546 B2
DATED : June 8, 2004
INVENTOR(S) : Easterday et al.

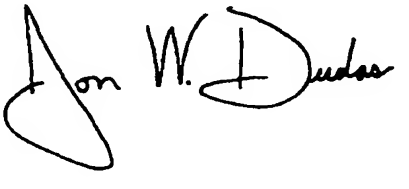
It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Please replace the specification with the new attached specification including Figure 1.

Please replace Formal Drawings 1-5 with the attached drawings.

Signed and Sealed this

Twenty-third Day of November, 2004



JON W. DUDAS
Director of the United States Patent and Trademark Office

10,002,546.

(12) **United States Patent**
Easterday et al.

(10) **Patent No.: US 6,746,546 B2**
(45) **Date of Patent: Jun. 8, 2004**

(54) **LOW TEMPERATURE NITRIDING SALT AND METHOD OF USE**

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(73) Assignee: **Kolene Corporation**, Detroit, MI (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 135 days.

(21) Appl. No.: **10/002,282**

(22) Filed: **Nov. 2, 2001**

(65) **Prior Publication Data**

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(51) **Int. Cl.**[7] **C23C 8/26**
(52) **U.S. Cl.** **148/228**; 148/229; 148/240; 148/242; 148/274
(58) **Field of Search** 148/228, 229, 148/240, 242, 274; 252/390

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* cited by examiner

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(57) **ABSTRACT**

A composition for nitrocarburizing stainless steel parts and a method for producing a nitride or hard case on such parts using the composition, are provided. The composition includes alkali metal cyanate and alkali metal carbonate, wherein the cyanate ion is present in a weight percentage of greater than 45% and less than 55.2%. The composition is fused and maintained between about 750° F. and about 950° F. depending upon the type of stainless steel to be treated. The workpiece is immersed in the fused bath and left in until a satisfactory compound layer or case is formed. With austenitic stainless steel, the piece is immersed from about four hours to about six hours at temperatures between about 750° F. and about 950° F., preferably between 750° F. and 850° F. to maintain corrosion resistance.

With 400 series stainless steel, increased corrosion resistance is achieved by immersion for between four and six hours at 950° F.

2 Claims, 5 Drawing Sheets

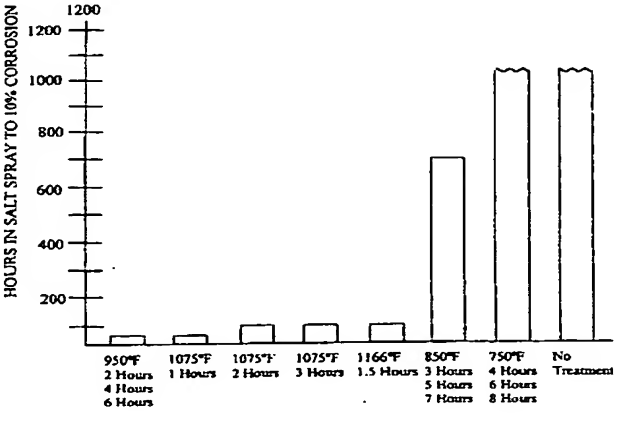


Fig 1

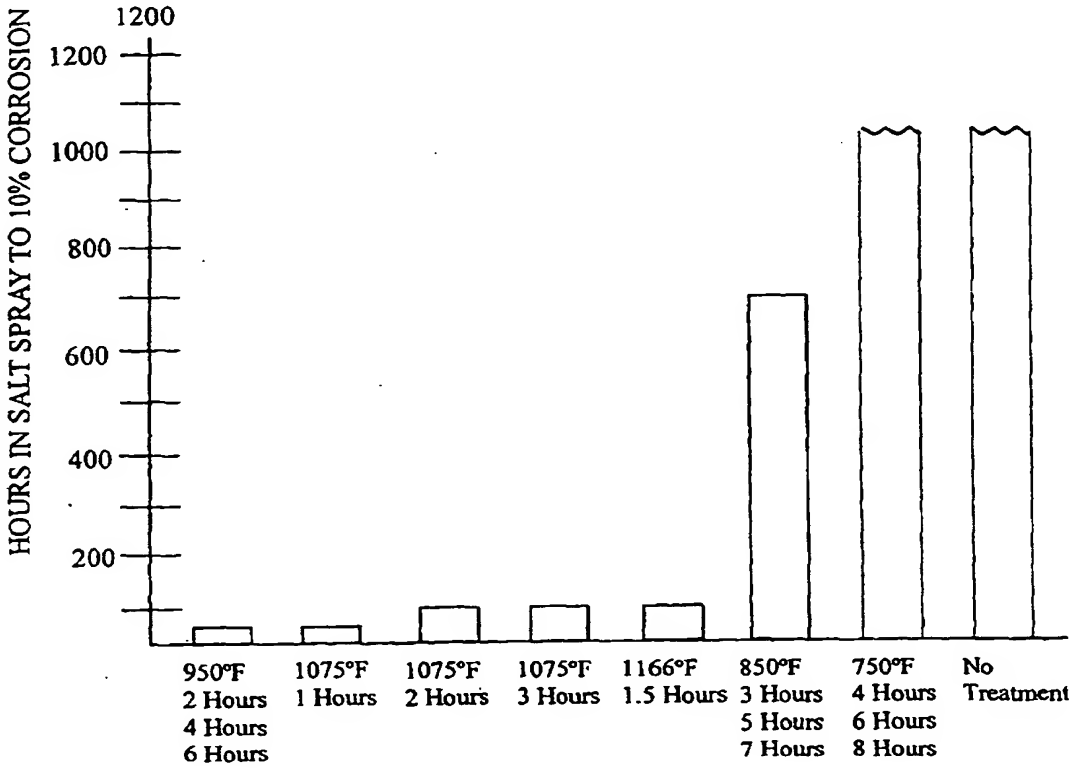

HOURS IN SALT SPRAY TO 10% CORROSION
1200
1200
1000
800
600
400
200
950°F 2 Hours 4 Hours 6 Hours
1075°F 1 Hours
1075°F 2 Hours
1075°F 3 Hours
1166°F 1.5 Hours
850°F 3 Hours 5 Hours 7 Hours
750°F 4 Hours 6 Hours 8 Hours
No Treatment

Fig 1

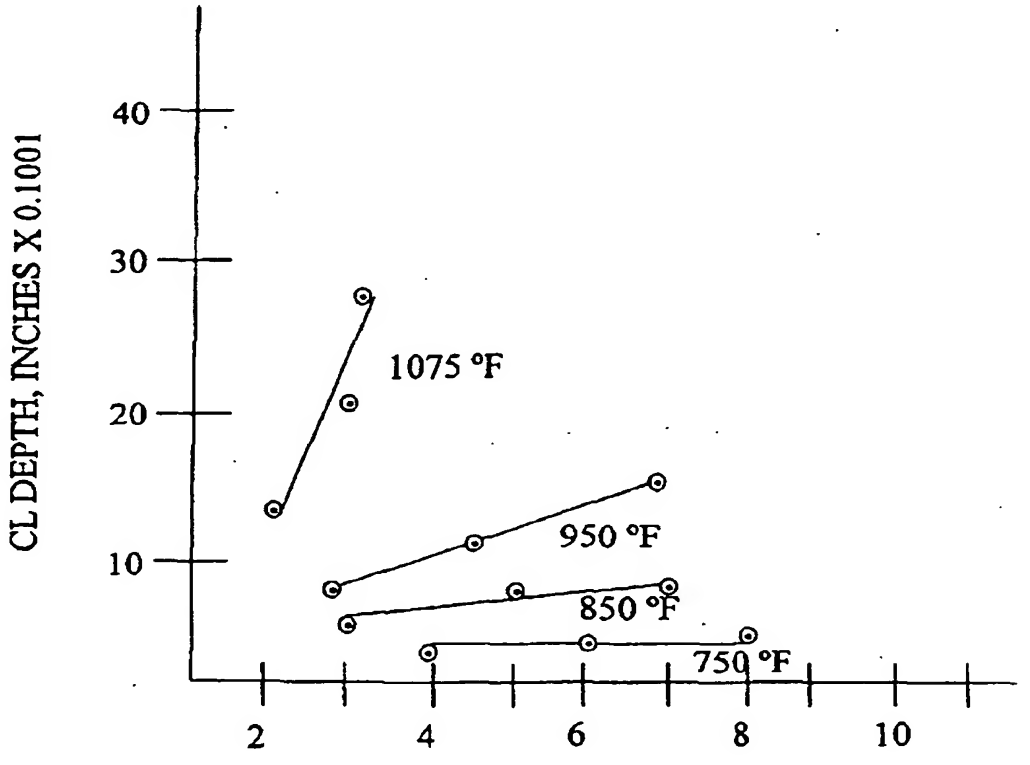
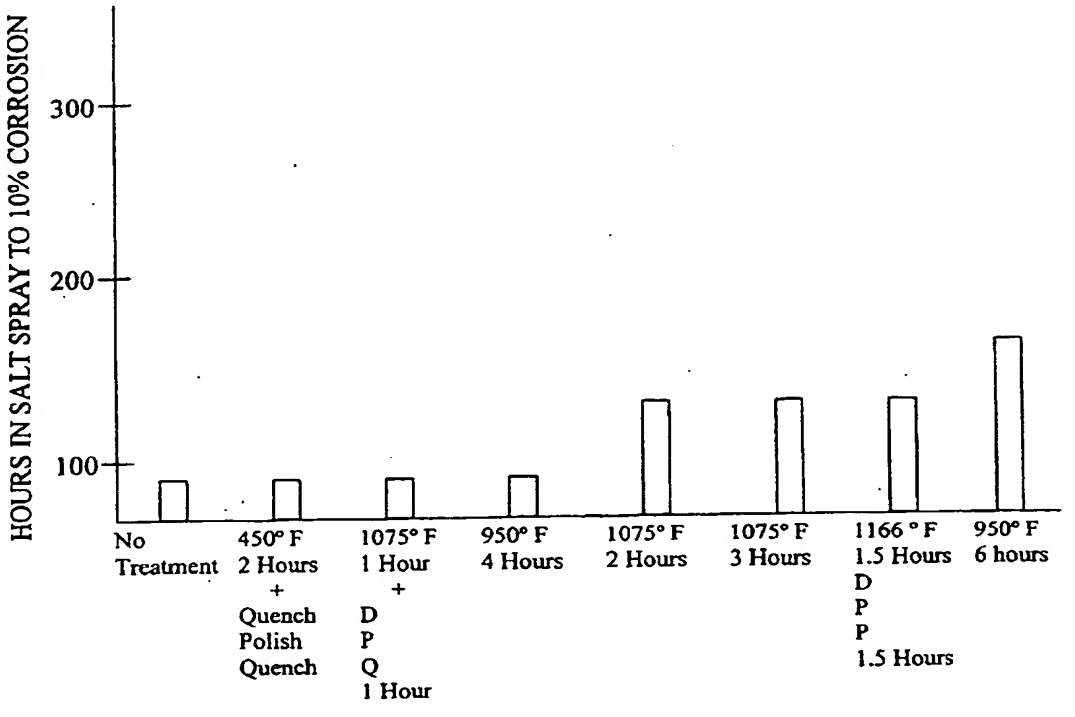
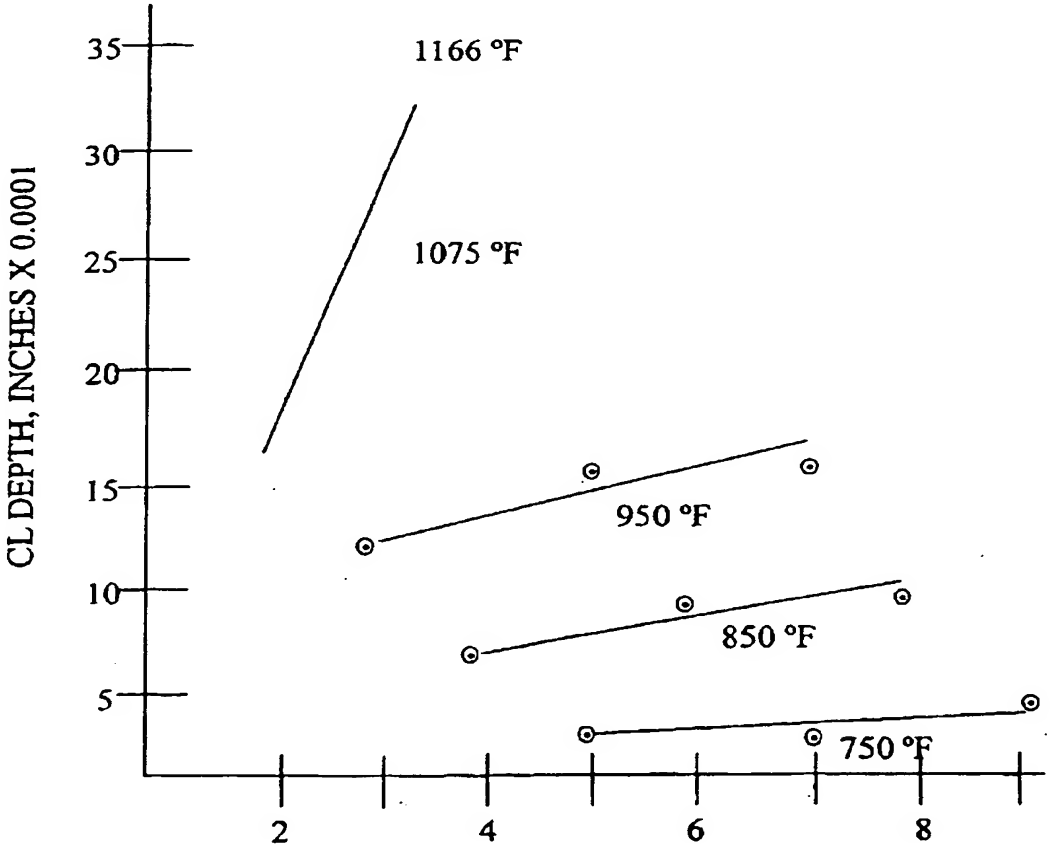

CL DEPTH, INCHES X 0.1001
40
30
20
10
1075 °F
950 °F
850 °F
750 °F
2
4
6
8
10
TIME IN BATH, HOURS
304 STAINLESS STEEL

Fig 2



4/6 STAINLESS STEEL

Fig 3



DIFFUSION 416 STAINLESS STEEL

Fig 4

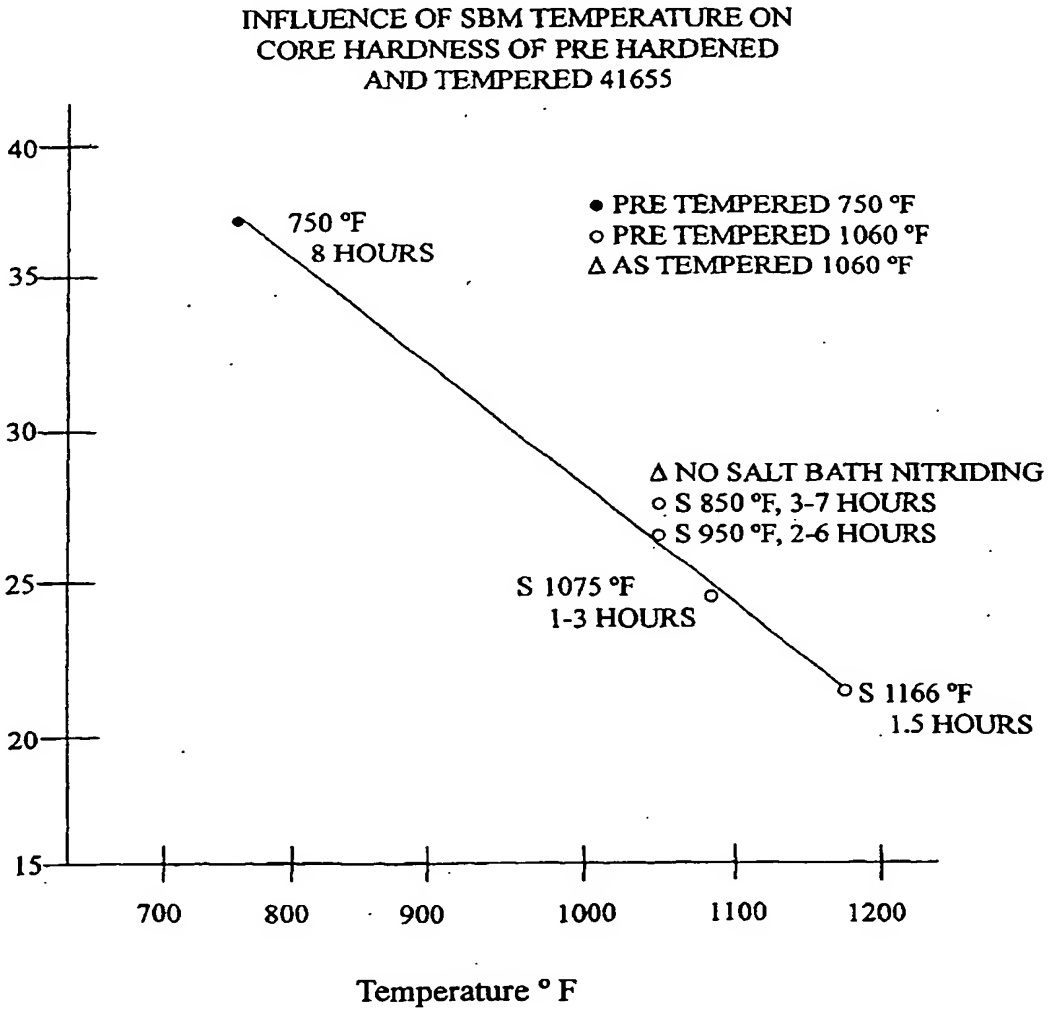

INFLUENCE OF SBM TEMPERATURE ON
CORE HARDNESS OF PRE HARDENED
AND TEMPERED 41655
40
35
30
25
20
15
700
800
900
1000
1100
1200
750 °F
8 HOURS
• PRE TEMPERED 750 °F
o PRE TEMPERED 1060 °F
Δ AS TEMPERED 1060 °F
Δ NO SALT BATH NITRIDING
o S 850 °F, 3-7 HOURS
o S 950 °F, 2-6 HOURS
S 1075 °F
1-3 HOURS
S 1166 °F
1.5 HOURS
Temperature ° F

Fig 5